SEQUENCE LISTING

<110> Cahoon, Rebecca E
Miao, Gou-Hau
Powell, Wayne

<120> Plant Farnesyltransferases

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<141> 2001-06-04

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Ala Tyr Arg Asp Asp Phe Arg Glu Val Met Asp Tyr Phe Arg Ala Leu
        35                  40                  45

Tyr Leu Thr Gly Glu Arg Ser Pro Arg Ala Leu Arg Leu Thr Ala Glu
    50                  55                  60

Ala Ile Glu Leu Asn Pro Gly Asn Tyr Thr Val Trp His Phe Arg Arg
65                  70                  75                  80

Leu Ile Leu Glu Ser Leu Asp Phe Asp Leu Leu Glu Glu Met Lys Phe
                85                  90                  95

Val Glu Lys Ile Ala Glu Cys Asn Pro Lys Asn Tyr Gln Ile Trp His
            100                 105                 110

His Lys Arg Trp Leu Ala Glu Lys Leu Gly Pro Gly Ile Ala Asn Lys
        115                 120                 125

Glu His Glu Phe Thr Met Lys Ile Leu Ala Ile Asp Ala Lys Asn Tyr
    130                 135                 140

His Ala Trp Ser His Arg Gln Trp Val Leu Gln Ala Leu Gly Gly Trp
145                 150                 155                 160

Glu Thr Glu Leu Glu Tyr Cys Asp His Leu Leu Lys Glu Asp Val Phe
                165                 170                 175

Asn Asn Ser Ala Trp Asn Gln Arg Tyr Phe Val Ile Thr Arg Ser Pro
            180                 185                 190

Phe Leu Gly Gly Leu Ala Ala Met Arg Asp Ser Glu Val Asp Tyr Thr
        195                 200                 205

Ile Glu Ala Ile Leu Ala Asn Ala Gln Asn Glu Ser Pro Trp Arg Tyr
    210                 215                 220

Leu Lys Gly Leu Tyr Lys Gly Glu Asn Asn Leu Leu Val Glu Asp Glu
225                 230                 235                 240

Arg Ile Ser Ala Val Cys Phe Lys Val Leu Lys Asn Asp Trp Thr Cys
                245                 250                 255

Val Phe Ala Leu Ser Leu Leu Leu Asp Leu Leu Cys Thr Gly Leu Gln
            260                 265                 270

Pro Ser Asp Glu Leu Arg Ser Thr Leu Glu Thr Ile Arg Ser Ser His
        275                 280                 285

Pro Glu Thr Ala Asp Asp Asp Pro Ala Ala Ala Val Cys Cys Ile Leu
    290                 295                 300
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Thr Leu Ser Gln Ile Ser
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<213> Oryza sativa

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             20                  25                  30

Asp Asp Gly Pro His Pro Val Val Ala Ile Ala Tyr Arg Asp Glu Phe
         35                  40                  45

Arg Glu Val Met Asp Tyr Phe Arg Ala Leu Tyr Phe Ala Gly Glu Arg
     50                  55                  60

Ser Val Arg Ala Leu His Leu Thr Ala Glu Val Ile Asp Leu Asn Pro
 65                  70                  75                  80

Gly Asn Tyr Thr Val Trp His Phe Arg Arg Leu Val Leu Glu Ala Leu
                 85                  90                  95
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Asp Ala Asp Leu Arg Glu Glu Met Asp Phe Val Asp Arg Ile Ala Glu
100 105 110

Cys Asn Pro Lys Asn Tyr Gln Ile Trp His His Lys Arg Trp Leu Ala
115 120 125

Glu Lys Leu Gly Pro Asp Ile Ala Asn Lys Glu His Glu Phe Thr Arg
130 135 140

Lys Ile Leu Ser Met Asp Ala Lys Asn Tyr His Ala Trp Ser His Arg
145 150 155 160

Gln Trp Val Leu Gln Ala Leu Gly Gly Trp Glu Thr Glu Leu Gln Tyr
165 170 175

Cys Asn Gln Leu Leu Glu Glu Asp Val Phe Asn Asn Ser Ala Trp Asn
180 185 190

Gln Arg Tyr Leu Val Ile Thr Ser Ser Pro Leu Leu Gly Gly Leu Ala
195 200 205

Ala Met Arg Asp Ser Glu Val Asp Tyr Thr Val Gly Ala Ile Leu Ala
210 215 220

Asn Pro Gln Asn Glu Ser Pro Trp Arg Tyr Leu Lys Gly Leu Tyr Lys
225 230 235 240

Gly Glu Asn Asn Leu Leu Met Ala Asp Glu Arg Ile Ser Asp Val Cys
245 250 255

Leu Lys Val Leu Lys His Asp Ser Thr Cys Val Phe Ala Leu Ser Leu
260 265 270

Leu Leu Asp Leu Leu Gln Ile Gly Leu Gln Pro Ser Asp Glu Leu Lys
275 280 285

Gly Thr Ile Glu Ala Ile Lys Asn Ser Asp Pro Glu Ala Asp Glu Ala
290 295 300

Val Asp Ala Asp Leu Ala Thr Ala Ile Cys Ser Ile Leu Gln Arg Cys
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Ser Gln Thr

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<212> DNA
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<213> Glycine max

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Asp Gly Pro Asn Pro Val Val Pro Ile Gln Tyr Thr Glu Glu Phe Ser
35 40 45

Glu Val Met Asp Tyr Phe Arg Ala Val Tyr Leu Thr Asp Glu Arg Ser
50 55 60

Pro Arg Ala Leu Ala Leu Thr Ala Glu Ala Val Gln Phe Asn Ser Gly
65 70 75 80

Asn Tyr Thr Val Trp His Phe Arg Arg Leu Leu Leu Glu Ser Leu Lys
85 90 95

Val Asp Leu Asn Asp Glu Leu Asp Phe Val Glu Arg Met Ala Ala Gly
100 105 110

Asn Ser Lys Asn Tyr Gln Met Trp His His Arg Arg Trp Val Ala Glu
115 120 125

Lys Leu Gly Pro Glu Ala Arg Asn Asn Glu Leu Glu Phe Thr Lys Lys
130 135 140

Ile Leu Ser Val Asp Ala Lys His Tyr His Ala Trp Ser His Arg Gln
145 150 155 160

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Trp Ala Leu Gln Thr Leu Gly Gly Trp Glu Asp Glu Leu Asn Tyr Cys
                165                 170                 175

Thr Glu Leu Leu Lys Glu Asp Ile Phe Asn Asn Ser Ala Trp Asn Gln
            180                 185                 190

Arg Tyr Phe Val Ile Thr Arg Ser Pro Phe Leu Gly Gly Leu Lys Ala
        195                 200                 205

Met Arg Glu Ser Glu Val Leu Tyr Thr Ile Glu Ala Ile Ile Ala Tyr
    210                 215                 220

Pro Glu Asn Glu Ser Ser Trp Arg Tyr Leu Arg Gly Leu Tyr Lys Gly
225                 230                 235                 240

Glu Thr Thr Ser Trp Val Asn Asp Pro Gln Val Ser Ser Val Cys Leu
                245                 250                 255

Lys Ile Leu Arg Thr Lys Ser Asn Tyr Val Phe Ala Leu Ser Thr Ile
            260                 265                 270

Leu Asp Leu Ile Cys Phe Gly Tyr Gln Pro Asn Glu Asp Ile Arg Asp
        275                 280                 285

Ala Ile Asp Ala Leu Lys Thr Ala Asp Met Asp Lys Gln Asp Leu Asp
    290                 295                 300

Asp Asp Glu Lys Gly Glu Gln Gln Asn Leu Asn Ile Ala Arg Asn Ile
305                 310                 315                 320

Cys Ser Ile Leu Lys Gln Val Asp Pro Ile Arg Thr Asn Tyr Trp Ile
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Asp Gly Pro Asn Pro Val Val Pro Ile Gln Tyr Thr Glu Glu Phe Ser
35 40 45

Glu Val Met Asp Tyr Phe Arg Ala Val Tyr Leu Thr Asp Glu Arg Ser
50 55 60

Pro Arg Ala Leu Ala Leu Thr Ala Glu Ala Val Gln Phe Asn Ser Gly
65 70 75 80

Asn Tyr Thr Val Trp His Phe Arg Arg Leu Leu Leu Glu Ser Leu Lys
85 90 95

Val Asp Leu Asn Asp Glu Leu Glu Phe Val Glu Arg Met Ala Ala Gly
100 105 110

Asn Ser Lys Asn Tyr Gln Met Trp Cys Asp Ala Leu Leu Cys Ser Phe
115 120 125

Phe His Thr Leu His His Arg Arg Trp Val Ala Glu Lys Leu Gly Pro
130 135 140

Glu Ala Arg Asn Asn Glu Leu Glu Phe Thr Lys Lys Ile Leu Ser Val
145 150 155 160

Asp Ala Lys His Tyr His Ala Trp Ser His Arg Gln Trp Ala Leu Gln
165 170 175

Thr Leu Gly Gly Trp Glu Asp Glu Leu Asn Tyr Cys Thr Glu Leu Leu
180 185 190

Lys Glu Asp Ile Phe Asn Asn Ser Ala Trp Asn Gln Arg Tyr Phe Val
195 200 205

Ile Thr Arg Ser Pro Phe Leu Gly Gly Leu Lys Ala Met Arg Glu Ser
210 215 220

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Glu Val Leu Tyr Thr Ile Glu Ala Ile Ile Ala Tyr Pro Glu Asn Glu
225                 230                 235                 240

Ser Ser Trp Arg Tyr Leu Arg Gly Leu Tyr Lys Gly Glu Thr Thr Ser
                245                 250                 255

Trp Val Asn Asp Pro Gln Val Ser Ser Val Cys Leu Lys Ile Leu Arg
            260                 265                 270

Thr Lys Ser Asn Tyr Val Phe Ala Leu Ser Thr Ile Leu Asp Leu Ile
        275                 280                 285

Cys Phe Gly Tyr Gln Pro Asn Glu Asp Ile Arg Asp Ala Ile Asp Ala
    290                 295                 300

Leu Lys Thr Ala Asp Met Asp Lys Gln Asp Leu Asp Asp Asp Glu Lys
305                 310                 315                 320

Gly Glu Gln Gln Asn Leu Asn Ile Ala Arg Asn Ile Cys Ser Ile Leu
                325                 330                 335

Lys Gln Val Asp Pro Ile Arg Thr Asn Tyr Trp Ile Trp Arg Lys Ser
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Arg Leu Pro Leu Ser Ala
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<213> Triticum aestivum

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<400> 10

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Leu Tyr Ala Ala Gly Glu Arg Ser Pro Arg Ala Leu Arg Leu Thr Ala
         35                  40                  45

Asp Ala Ile His Leu Asn Pro Gly Asn Tyr Thr Val Trp His Phe Arg
     50                  55                  60

Arg Val Val Leu Glu Ala Leu Asp Ala Asp Leu Leu Leu Glu Met His
 65                  70                  75                  80

Phe Val Asp Gln Ile Ala Glu Ser Asn Pro Lys Asn Tyr Gln Val Trp
                 85                  90                  95

His His Lys Arg Trp Leu Ala Glu Lys Ile Gly Pro Asp Ala Ala Asn
            100                 105                 110

Ser Glu His Asp Phe Thr Arg Lys Ile Leu Ala Met Asp Ala Lys Asn
        115                 120                 125

Tyr His Ala Trp Ser His Arg Gln Trp Val Leu Gln Ala Leu Gly Gly
    130                 135                 140

Trp Glu Ser Glu Leu Gln Tyr Cys Asn Gln Leu Leu Glu Glu Asp Val
145                 150                 155                 160

Phe Asn Asn Ser Ala Trp Asn Gln Arg Tyr Leu Val Val Thr Arg Ser
                165                 170                 175

Pro Ile Leu Gly Gly Leu Ala Ala Met Arg Asp Ser Glu Val Asp Tyr
            180                 185                 190

Thr Val Glu Ala Ile Met Val Asn Pro Gln Asn Glu Ser Pro Trp Arg
        195                 200                 205

Tyr Leu Arg Gly Leu Tyr Lys Asp Asp Asn Asn Leu Leu Val Ala Asp
    210                 215                 220

Asn Arg Ile Ser Asp Ala Cys Leu Lys Val Leu Asn Lys Asp Trp Thr
225                 230                 235                 240

Cys Val Phe Ala Leu Ser Phe Leu Leu Asp Leu Leu Arg Met Gly Leu
                245                 250                 255

Gln Pro Ser Asn Glu Leu Lys Gly Thr Ile Glu Ala Met Glu Asn Ser
            260                 265                 270
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Asp Pro Glu Thr Gly His Ala Asp Ile Ala Val Ala Val Cys Ser Ile
        275                 280                 285

Leu Gln Lys Cys Asp Pro Leu Arg Ile Asn Tyr Trp Ser Trp Tyr Gln
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Thr Thr Leu Ser Ser
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<212> DNA
<213> Zea mays

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gaggatgcct gcagcaccag ttcatatggg tgcaccgcga aaaagtcttc ctctgctgtg 1020
gactatgcga agtttggatt tgattttata caacagagca accaaattgg cccactcttc 1080
cataacattg ccctgcaaca atacatccta ctttgttctc aggtactaga gggaggcttg 1140
agggataagc ctggaaagaa cagagatcac tatcattcat gctactgcct cagtggcctc 1200
gcagttagcc agtacagtgc catgactgat actggttcgt gcccattacc tcagcatgtg 1260
cttggaccgt actctaattt gctggagcca atccatccac tctacaatgt tgtcctagat 1320
aagtaccata cagcctatga gttcttctca gaagagtga                        1359
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<210> 12
<211> 452
<212> PRT
<213> Zea mays

<400> 12

```
Met Asp Pro Ser Pro Gln Ser Thr Pro Pro Thr Gly Asp Asp Pro Ala
  1               5                  10                  15

Ala Ala Ala Asp Pro Asp Leu Pro Arg Leu Thr Val Thr Gln Val Glu
             20                  25                  30

Gln Met Lys Val Glu Ala Arg Val Gly Asp Ile Tyr Arg Ser Leu Phe
         35                  40                  45

Gly Ala Ala Pro Asn Thr Lys Ser Ile Met Leu Glu Leu Trp Arg Asp
     50                  55                  60
```

Gln His Ile Glu Tyr Leu Thr Pro Gly Leu Arg His Met Gly Pro Ala
65 70 75 80

Phe His Val Leu Asp Ala Asn Arg Pro Trp Leu Cys Tyr Trp Met Val
85 90 95

His Pro Leu Ala Leu Leu Asp Glu Ala Leu Asp Asp Asp Leu Glu Asn
100 105 110

Asp Ile Ile Asp Phe Leu Ala Arg Cys Gln Asp Lys Asp Gly Gly Tyr
115 120 125

Ser Gly Gly Pro Gly Gln Leu Pro His Leu Ala Thr Thr Tyr Ala Ala
130 135 140

Val Asn Thr Leu Val Thr Ile Gly Ser Glu Arg Ala Leu Ser Ser Ile
145 150 155 160

Asn Arg Gly Asn Leu Tyr Asn Phe Met Leu Gln Met Lys Asp Val Ser
165 170 175

Gly Ala Phe Arg Met His Asp Gly Gly Glu Ile Asp Val Arg Ala Ser
180 185 190

Tyr Thr Ala Ile Ser Val Ala Ser Leu Val Asn Ile Leu Asp Phe Lys
195 200 205

Leu Ala Lys Gly Val Gly Asp Tyr Ile Ala Arg Cys Gln Thr Tyr Glu
210 215 220

Gly Gly Ile Ala Gly Glu Pro Tyr Ala Glu Ala His Gly Gly Tyr Thr
225 230 235 240

Phe Cys Gly Leu Ala Ala Leu Ile Leu Leu Asn Glu Ala Glu Lys Val
245 250 255

Asp Leu Pro Ser Leu Ile Gly Trp Val Ala Phe Arg Gln Gly Val Glu
260 265 270

Cys Gly Phe Gln Gly Arg Thr Asn Lys Leu Val Asp Gly Cys Tyr Ser
275 280 285

Phe Trp Gln Gly Ala Ala Ile Ala Phe Thr Gln Lys Leu Ile Thr Ile
290 295 300

Val Asp Lys Gln Leu Lys Ser Ser Tyr Ser Cys Lys Arg Pro Ser Gly
305 310 315 320

Glu Asp Ala Cys Ser Thr Ser Ser Tyr Gly Cys Thr Ala Lys Lys Ser
325 330 335

Ser Ser Ala Val Asp Tyr Ala Lys Phe Gly Phe Asp Phe Ile Gln Gln
340 345 350

Ser Asn Gln Ile Gly Pro Leu Phe His Asn Ile Ala Leu Gln Gln Tyr
355 360 365

```
Ile Leu Leu Cys Ser Gln Val Leu Glu Gly Gly Leu Arg Asp Lys Pro
    370                 375                 380

Gly Lys Asn Arg Asp His Tyr His Ser Cys Tyr Cys Leu Ser Gly Leu
385                 390                 395                 400

Ala Val Ser Gln Tyr Ser Ala Met Thr Asp Thr Gly Ser Cys Pro Leu
                405                 410                 415

Pro Gln His Val Leu Gly Pro Tyr Ser Asn Leu Leu Glu Pro Ile His
            420                 425                 430

Pro Leu Tyr Asn Val Val Leu Asp Lys Tyr His Thr Ala Tyr Glu Phe
        435                 440                 445

Phe Ser Glu Glu
    450
```

<210> 13
<211> 1031
<212> DNA
<213> Oryza sativa

<400> 13

```
gcacgagggc gtagccgcct ttcggtgaga tccccgcggc tgcagcgagc tcgcaggccg 60
ccgccttccg cgccgccgac caccgcgccc atggaccccc cctcgccgcc gccgccgccg 120
ccatatcctc ctgctgctgc tgagggcggt ccggcagcgg atagccaggc cgctgagctg 180
ccccggctga ctgtgacgca ggtggagcag atgaaggtgg aggcgaaggt gggcgaaatc 240
taccgcgtcc tcttcggcaa cgcgcccaac gccaattccc tcatgttaga gctgtggcgt 300
gagcagcatg ttgagtattt gacgagaggg ctgaaacatc ttggaccaag cttccatgtg 360
ctcgatgcca atcgaccttg gctgtgctac tggattattc atgcacttgc tctgttggat 420
gaaatacctg acgatgttga ggatgatatt gtggacttct tatctcgatg tcaggacaaa 480
gatggtggtt atggcggagg acctggacag ttgcctcatc tcgctacaac ttatgctgct 540
gtaaatacac ttgtaactat agggagtgaa agggcactat catcggtaaa cagggacaac 600
ctgtacaagt tcatgcttcg gatgaaagat acatcgggag ctttcagaat gcatgatggt 660
ggtgaaatag atgttcgtgc tagctatact gcaatatcgg ttgccagcct tgtgaacatt 720
cttgatggtg aactagcaaa aggtgttgga aattacataa caaggtgtca aacctatgaa 780
ggtggcattg ctggggaacc gtatgctgaa gctcatggtg ggtacacttt ttgtgggctg 840
gctacgatga tcctgcttaa cgaagtggac aaacttgatt tggctagctt gattggctgg 900
gtggcatttc gccaaggagt ggaatgtgga tttcaaggac gaactaataa attggttgat 960
ggttgctact ccttttggca gggagctgct cttgctttaa ctgttcaccg cgtggcgccg 1020
actgccaaac g                                                      1031
```

<210> 14
<211> 313
<212> PRT
<213> Oryza sativa

<400> 14

```
Met Asp Pro Pro Ser Pro Pro Pro Pro Pro Pro Tyr Pro Pro Ala Ala
  1               5                  10                  15

Ala Glu Gly Gly Pro Ala Ala Asp Ser Gln Ala Ala Glu Leu Pro Arg
             20                  25                  30

Leu Thr Val Thr Gln Val Glu Gln Met Lys Val Glu Ala Lys Val Gly
         35                  40                  45
```

```
Glu Ile Tyr Arg Val Leu Phe Gly Asn Ala Pro Asn Ala Asn Ser Leu
     50                  55                  60

Met Leu Glu Leu Trp Arg Glu Gln His Val Glu Tyr Leu Thr Arg Gly
 65                  70                  75                  80

Leu Lys His Leu Gly Pro Ser Phe His Val Leu Asp Ala Asn Arg Pro
                 85                  90                  95

Trp Leu Cys Tyr Trp Ile Ile His Ala Leu Ala Leu Leu Asp Glu Ile
            100                 105                 110

Pro Asp Asp Val Glu Asp Asp Ile Val Asp Phe Leu Ser Arg Cys Gln
        115                 120                 125

Asp Lys Asp Gly Gly Tyr Gly Gly Gly Pro Gly Gln Leu Pro His Leu
    130                 135                 140

Ala Thr Thr Tyr Ala Ala Val Asn Thr Leu Val Thr Ile Gly Ser Glu
145                 150                 155                 160

Arg Ala Leu Ser Ser Val Asn Arg Asp Asn Leu Tyr Lys Phe Met Leu
                165                 170                 175

Arg Met Lys Asp Thr Ser Gly Ala Phe Arg Met His Asp Gly Gly Glu
            180                 185                 190

Ile Asp Val Arg Ala Ser Tyr Thr Ala Ile Ser Val Ala Ser Leu Val
        195                 200                 205

Asn Ile Leu Asp Gly Glu Leu Ala Lys Gly Val Gly Asn Tyr Ile Thr
    210                 215                 220

Arg Cys Gln Thr Tyr Glu Gly Gly Ile Ala Gly Glu Pro Tyr Ala Glu
225                 230                 235                 240

Ala His Gly Gly Tyr Thr Phe Cys Gly Leu Ala Thr Met Ile Leu Leu
                245                 250                 255

Asn Glu Val Asp Lys Leu Asp Leu Ala Ser Leu Ile Gly Trp Val Ala
            260                 265                 270

Phe Arg Gln Gly Val Glu Cys Gly Phe Gln Gly Arg Thr Asn Lys Leu
        275                 280                 285

Val Asp Gly Cys Tyr Ser Phe Trp Gln Gly Ala Ala Leu Ala Leu Thr
    290                 295                 300

Val His Arg Val Ala Pro Thr Ala Lys
305                 310

<210> 15
<211> 1504
<212> DNA
<213> Glycine max
```

<400> 15
gcacgaggac aaatccgccg ccgccgccgc cgtgtccgac ggtgagtcaa cgtgagcaat 60
ggatggtaga gtcgcaggtg tttcagattt accaactctt cgccaccatt cctcgcaacg 120
cccaaaccct catgttggag cttcaacgcg ataatcacat gcagtatgtc tccaaaggcc 180
ttcgccatct cagttccgca ttttccgttt tggacgctaa tcgaccctgg ctctgctact 240
ggatcttcca ctccattgct ttgtcgggag aatccgtcga tgatgaactc gaagataacg 300
ctatcgattt tcttaaccgt tgccaggatc cgaatggtgg atatgccggg ggaccaggcc 360
agatgcctca tattgccaca acttatgctg ctgttaattc acttattact ttgggtggtg 420
agaaatccct ggcatcaatt aatagagata aactgtatgg gtttctgcgg cggatgaagc 480
aaccaaatgg tggattcagg atgcatgatg aaggtgaaat tgatgttcga gcttgctaca 540
ctgccatttc tgttgcaagt gttttgaaca ttttggatga tgagctgatc cagaatgttg 600
gagactacat tataagctgt caaacatatg agggtggcat tgctggtgag cctggttctg 660
aggctcatgg tgggtacacc ttttgtggat tagctacaat gattctgatt ggtgaggtta 720
atcacttgga tctgcctcga ttagttgact gggtggtatt ccgacaaggt aaggaatgtg 780
gattccaggg gagaacaaat aaactggtgg atggatgcta ttccttttgg cagggaggtg 840
ctgttgctct attgcaaaga ttatcttcta ttatcaacaa acagatggaa gagacatcac 900
agatttttgc ggtatcttat gtatctgaag caaaagaaag tttggatgga acctctagtc 960
atgcaacatg ccgtggtgag catgaaggca ccagtgaatc cagttcatct gattttaaaa 1020
atattgccta taaatttatt aatgagtgga gagcacaaga accacttttt cacagtattg 1080
ctttacagca atatattctc ttatgtgcac aggagcaaga gggtggactg agagacaaac 1140
cgggtaaacg tagagatcat tatcacacat gttactgttt aagtggactc tcattgtgcc 1200
agtatagttg gtcaaagcac ccagattctc caccactgcc taatctagta ttaggcccct 1260
actctaatct cttagaacca atccaccccc tctttaatgt tgtcttggga cgatatcgtg 1320
aagctcatga attcttcttt actgagtcgt gaccactggt tttagctacc aacaacttta 1380
tttgtataat gtaaaataaa ttcattggaa catataaatg taaaacagca ttggattaaa 1440
aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa 1500
aaaa 1504

<210> 16
<211> 429
<212> PRT
<213> Glycine max

<400> 16
Met Val Glu Ser Gln Val Phe Gln Ile Tyr Gln Leu Phe Ala Thr Ile
1 5 10 15

Pro Arg Asn Ala Gln Thr Leu Met Leu Glu Leu Gln Arg Asp Asn His
20 25 30

Met Gln Tyr Val Ser Lys Gly Leu Arg His Leu Ser Ser Ala Phe Ser
35 40 45

Val Leu Asp Ala Asn Arg Pro Trp Leu Cys Tyr Trp Ile Phe His Ser
50 55 60

Ile Ala Leu Ser Gly Glu Ser Val Asp Asp Glu Leu Glu Asp Asn Ala
65 70 75 80

Ile Asp Phe Leu Asn Arg Cys Gln Asp Pro Asn Gly Gly Tyr Ala Gly
85 90 95

Gly Pro Gly Gln Met Pro His Ile Ala Thr Thr Tyr Ala Ala Val Asn
100 105 110

Ser Leu Ile Thr Leu Gly Gly Glu Lys Ser Leu Ala Ser Ile Asn Arg
115 120 125

Asp Lys Leu Tyr Gly Phe Leu Arg Arg Met Lys Gln Pro Asn Gly Gly
130 135 140

Phe Arg Met His Asp Glu Gly Glu Ile Asp Val Arg Ala Cys Tyr Thr
145 150 155 160

Ala Ile Ser Val Ala Ser Val Leu Asn Ile Leu Asp Asp Glu Leu Ile
165 170 175

Gln Asn Val Gly Asp Tyr Ile Ile Ser Cys Gln Thr Tyr Glu Gly Gly
180 185 190

Ile Ala Gly Glu Pro Gly Ser Glu Ala His Gly Gly Tyr Thr Phe Cys
195 200 205

Gly Leu Ala Thr Met Ile Leu Ile Gly Glu Val Asn His Leu Asp Leu
210 215 220

Pro Arg Leu Val Asp Trp Val Val Phe Arg Gln Gly Lys Glu Cys Gly
225 230 235 240

Phe Gln Gly Arg Thr Asn Lys Leu Val Asp Gly Cys Tyr Ser Phe Trp
245 250 255

Gln Gly Gly Ala Val Ala Leu Leu Gln Arg Leu Ser Ser Ile Ile Asn
260 265 270

Lys Gln Met Glu Glu Thr Ser Gln Ile Phe Ala Val Ser Tyr Val Ser
275 280 285

Glu Ala Lys Glu Ser Leu Asp Gly Thr Ser Ser His Ala Thr Cys Arg
290 295 300

Gly Glu His Glu Gly Thr Ser Glu Ser Ser Ser Ser Asp Phe Lys Asn
305 310 315 320

Ile Ala Tyr Lys Phe Ile Asn Glu Trp Arg Ala Gln Glu Pro Leu Phe
325 330 335

His Ser Ile Ala Leu Gln Gln Tyr Ile Leu Leu Cys Ala Gln Glu Gln
340 345 350

Glu Gly Gly Leu Arg Asp Lys Pro Gly Lys Arg Arg Asp His Tyr His
355 360 365

Thr Cys Tyr Cys Leu Ser Gly Leu Ser Leu Cys Gln Tyr Ser Trp Ser
370 375 380

Lys His Pro Asp Ser Pro Pro Leu Pro Asn Leu Val Leu Gly Pro Tyr
385 390 395 400

Ser Asn Leu Leu Glu Pro Ile His Pro Leu Phe Asn Val Val Leu Gly
405 410 415

Arg Tyr Arg Glu Ala His Glu Phe Phe Phe Thr Glu Ser
420 425

<210> 17
<211> 533
<212> DNA
<213> Glycine max

<220>
<221> unsure
<222> (499)
<223> n = A, C, G or T

<220>
<221> unsure
<222> (525)
<223> n = A, C, G or T

<400> 17
gagagagata cgaatccggc ggcggcgcca ccgtgtccga cggtgagtca acgggaccag 60
tggatggtag agtcgcaggt gtttcagatt taccaactct ttgccaccat tcctggcagc 120
gcccaaaacc tcatgttaga gctgcaacgc gataatcaca tgcagtatct ctccaaaggc 180
ctacgccatc tcagttccgc gttttctgtc ttggacgcta atcgaccctg gctctgttac 240
tggatcttcc attccattgc tttgctggga gaatccgtcg acgacgaact cgaagataac 300
actatcgatt ttcttaaccg ttgccaggat ccgaatggtg gatatgctgg gggaccaggc 360
cagatgcctc acattgccac aacatatgct gcagttaata cacttattac tttgggtggt 420
cagaaatcct ggcatcaatt aataggtgag ataaactgta tgggtttctg cggcggatga 480
agcaatcaaa tggggggant caagatgcat gatgaaagga gaaanttgat gtc 533

<210> 18
<211> 141
<212> PRT
<213> Glycine max

<400> 18
Asp Thr Asn Pro Ala Ala Ala Pro Pro Cys Pro Thr Val Ser Gln Arg
1 5 10 15

Asp Gln Trp Met Val Glu Ser Gln Val Phe Gln Ile Tyr Gln Leu Phe
20 25 30

Ala Thr Ile Pro Gly Ser Ala Gln Asn Leu Met Leu Glu Leu Gln Arg
35 40 45

Asp Asn His Met Gln Tyr Leu Ser Lys Gly Leu Arg His Leu Ser Ser
50 55 60

Ala Phe Ser Val Leu Asp Ala Asn Arg Pro Trp Leu Cys Tyr Trp Ile
65 70 75 80

Phe His Ser Ile Ala Leu Leu Gly Glu Ser Val Asp Asp Glu Leu Glu
85 90 95

Asp Asn Thr Ile Asp Phe Leu Asn Arg Cys Gln Asp Pro Asn Gly Gly
100 105 110

Tyr Ala Gly Gly Pro Gly Gln Met Pro His Ile Ala Thr Thr Tyr Ala
115 120 125

```
Ala Val Asn Thr Leu Ile Thr Leu Gly Gly Gln Lys Ser
    130                 135                 140

<210> 19
<211> 333
<212> PRT
<213> Pisum sativum

<400> 19
Met Ala Gly Asn Ile Glu Val Glu Glu Asp Asp Arg Val Pro Leu Arg
  1               5                  10                  15

Leu Arg Pro Glu Trp Ser Asp Val Thr Pro Ile Pro Gln Asp Asp Gly
             20                  25                  30

Pro Ser Pro Val Val Pro Ile Asn Tyr Ser Glu Glu Phe Ser Glu Val
         35                  40                  45

Met Asp Tyr Phe Arg Ala Val Tyr Phe Ala Lys Glu Leu Ser Ser Arg
     50                  55                  60

Ala Leu Ala Leu Thr Ala Glu Ala Ile Gly Leu Asn Ala Gly Asn Tyr
 65                  70                  75                  80

Thr Val Trp His Phe Arg Arg Leu Leu Leu Glu Ser Leu Lys Val Asp
                 85                  90                  95

Leu His Val Glu Arg Glu Phe Val Glu Arg Val Ala Ser Gly Asn Ser
            100                 105                 110

Lys Asn Tyr Gln Ile Trp His His Arg Arg Trp Val Ala Glu Lys Leu
        115                 120                 125

Gly Pro Glu Ala Arg Asn Ser Glu Leu Glu Phe Thr Lys Lys Ile Leu
    130                 135                 140

Ser Val Asp Ala Lys His Tyr His Ala Trp Ser His Arg Gln Trp Val
145                 150                 155                 160

Leu Gln Asn Leu Gly Gly Trp Glu Asp Glu Leu Ser Tyr Cys Ser Glu
                165                 170                 175

Leu Leu Ala Glu Asp Ile Phe Asn Asn Ser Ala Trp Asn Gln Arg Tyr
            180                 185                 190

Phe Val Ile Thr Arg Ser Pro Val Leu Gly Gly Leu Lys Ala Met Arg
        195                 200                 205

Glu Ser Glu Val Leu Phe Thr Val Glu Ala Ile Ile Ser Tyr Pro Glu
    210                 215                 220

Asn Glu Ser Ser Trp Arg Tyr Leu Arg Gly Leu Phe Lys Asp Glu Ser
225                 230                 235                 240

Thr Leu Tyr Val Asn Asp Ala Gln Val Ser Ser Leu Cys Leu Lys Ile
                245                 250                 255
```

Leu Lys Thr Lys Ser Asn Tyr Leu Phe Ala Leu Ser Thr Leu Leu Asp
260 265 270

Leu Ser Ala Ser Val Ile Gln Pro Asn Glu Asp Phe Arg Asp Ala Ile
275 280 285

Glu Ala Leu Arg Leu Gln Ile Leu Ile Lys Gln Asp Ser Asp Ile Ala
290 295 300

Ile Thr Ile Cys Ser Ile Leu Glu Gln Val Asp Pro Ile Arg Val Asn
305 310 315 320

Tyr Trp Val Trp Arg Lys Ser Arg Leu Pro Gln Ala Ala
325 330

<210> 20
<211> 326
<212> PRT
<213> Arabidopsis thaliana

<400> 20
Met Asn Phe Asp Glu Thr Val Pro Leu Ser Gln Arg Leu Glu Trp Ser
1 5 10 15

Asp Val Val Pro Leu Thr Gln Asp Asp Gly Pro Asn Pro Val Val Pro
20 25 30

Ile Ala Tyr Lys Glu Glu Phe Arg Glu Thr Met Asp Tyr Phe Arg Ala
35 40 45

Ile Tyr Phe Ser Asp Glu Arg Ser Pro Arg Ala Leu Arg Leu Thr Glu
50 55 60

Glu Thr Leu Leu Leu Asn Ser Gly Asn Tyr Thr Val Trp His Phe Arg
65 70 75 80

Arg Leu Val Leu Glu Ala Leu Asn His Asp Leu Phe Glu Glu Leu Glu
85 90 95

Phe Ile Glu Arg Ile Ala Glu Asp Asn Ser Lys Asn Tyr Gln Leu Trp
100 105 110

His His Arg Arg Trp Val Ala Glu Lys Leu Gly Pro Asp Val Ala Gly
115 120 125

Arg Glu Leu Glu Phe Thr Arg Arg Val Leu Ser Leu Asp Ala Lys His
130 135 140

Tyr His Ala Trp Ser His Arg Gln Trp Thr Leu Arg Ala Leu Gly Gly
145 150 155 160

Trp Glu Asp Glu Leu Asp Tyr Cys His Glu Leu Leu Glu Ala Asp Val
165 170 175

Phe Asn Asn Ser Ala Trp Asn Gln Arg Tyr Tyr Val Ile Thr Gln Ser
180 185 190

```
Pro Leu Leu Gly Gly Leu Glu Ala Met Arg Glu Ser Glu Val Ser Tyr
        195                 200                 205

Thr Ile Lys Ala Ile Leu Thr Asn Pro Ala Asn Glu Ser Ser Trp Arg
    210                 215                 220

Tyr Leu Lys Ala Leu Tyr Lys Asp Asp Lys Glu Ser Trp Ile Ser Asp
225                 230                 235                 240

Pro Ser Val Ser Ser Val Cys Leu Asn Val Leu Ser Arg Thr Asp Cys
                245                 250                 255

Phe His Gly Phe Ala Leu Ser Thr Leu Leu Asp Leu Leu Cys Asp Gly
            260                 265                 270

Leu Arg Pro Thr Asn Glu His Lys Asp Ser Val Arg Ala Leu Ala Asn
        275                 280                 285

Glu Glu Pro Glu Thr Asn Leu Ala Asn Leu Val Cys Thr Ile Leu Gly
    290                 295                 300

Arg Val Asp Pro Ile Arg Ala Asn Tyr Trp Ala Trp Arg Lys Ser Lys
305                 310                 315                 320

Ile Thr Val Ala Ala Ile
                325
```

<210> 21
<211> 470
<212> PRT
<213> Lycopersicon esculentum

<400> 21

```
Met Glu Ser Arg Lys Val Thr Lys Thr Leu Glu Asp Gln Trp Val Val
  1               5                  10                  15

Glu Arg Arg Val Arg Glu Ile Tyr Asp Tyr Phe Tyr Ser Ile Ser Pro
             20                  25                  30

Asn Ser Pro Ser Asp Leu Ile Glu Ile Glu Arg Asp Lys His Phe Gly
         35                  40                  45

Tyr Leu Ser Gln Gly Leu Arg Lys Leu Gly Pro Ser Phe Ser Val Leu
     50                  55                  60

Asp Ala Ser Arg Pro Trp Leu Cys Tyr Trp Thr Leu His Ser Ile Ala
 65                  70                  75                  80

Leu Leu Gly Glu Ser Ile Gly Gly Lys Leu Glu Asn Asp Ala Ile Asp
                 85                  90                  95

Phe Leu Thr Arg Cys Gln Asp Lys Asp Gly Gly Tyr Gly Gly Gly Pro
            100                 105                 110

Gly Gln Met Pro His Leu Ala Thr Thr Tyr Ala Ala Val Asn Ser Leu
        115                 120                 125
```

Ile Thr Leu Gly Lys Pro Glu Ala Leu Ser Ser Ile Asn Arg Glu Lys
130 135 140

Leu Tyr Thr Phe Leu Leu Arg Met Lys Asp Ala Ser Gly Gly Phe Arg
145 150 155 160

Met His Asp Gly Gly Glu Val Asp Val Arg Ala Cys Tyr Thr Ala Ile
165 170 175

Ser Val Ala Asn Ile Leu Asn Ile Val Asp Asp Glu Leu Ile His Gly
180 185 190

Val Gly Asn Tyr Ile Leu Ser Cys Gln Thr Tyr Glu Gly Gly Ile Ala
195 200 205

Gly Glu Pro Gly Ser Glu Ala His Gly Gly Tyr Thr Phe Cys Gly Leu
210 215 220

Ala Ala Met Ile Leu Ile Asn Glu Val Asp Arg Leu Asp Leu Pro Gly
225 230 235 240

Leu Ile Asp Trp Val Val Phe Arg Gln Gly Val Glu Gly Gly Phe Gln
245 250 255

Gly Arg Thr Asn Lys Leu Val Asp Gly Cys Tyr Ser Phe Trp Gln Gly
260 265 270

Ala Val Val Phe Leu Ile Gln Arg Leu Asn Leu Ile Val His Glu Gln
275 280 285

Leu Gly Leu Ser Asn Asp Leu Ser Thr Glu Ser Ala Asp Asp Ser Ser
290 295 300

Glu Ser Glu Leu Ser Asp Glu Glu Glu His Leu Glu Gly Ile Ser Ser
305 310 315 320

His Val Gln Asp Thr Phe Pro Leu Gly Gln Ala Gly Ala Cys Gln Glu
325 330 335

Asn Ala Ser His Ser Pro Lys Ile Ala Asp Thr Gly Tyr Glu Phe Ile
340 345 350

Asn Arg Pro Ile Ala Met Arg Pro Leu Phe Asp Ser Met Tyr Leu Gln
355 360 365

Gln Tyr Val Leu Leu Cys Ser Gln Ile Glu Val Gly Gly Phe Arg Asp
370 375 380

Lys Pro Gly Lys Gly Arg Asp Tyr Tyr His Thr Cys Tyr Cys Leu Ser
385 390 395 400

Gly Leu Ser Ile Ala Gln Tyr Ser Trp Thr Asp Glu Ala Asp Ser Thr
405 410 415

Pro Leu Pro Arg Asp Val Phe Gly Pro Tyr Ser Lys Cys Leu Leu Glu
420 425 430

```
Gln Val His Pro Leu Phe Asn Val Val Leu Asp Arg Tyr Tyr Glu Ala
        435                 440                 445

Arg Glu Tyr Ser Gln Ala Cys Glu Thr Val Ser Pro Leu Ser Leu Ala
    450                 455                 460

Pro Thr Phe Ser Glu Thr
465                 470
```

<210> 22
<211> 419
<212> PRT
<213> Pisum sativum

<400> 22

```
Met Glu Ala Ser Thr Ala Ala Glu Thr Pro Thr Pro Thr Val Ser Gln
  1               5                  10                  15

Arg Asp Gln Trp Ile Val Glu Ser Gln Val Phe His Ile Tyr Gln Leu
             20                  25                  30

Phe Ala Asn Ile Pro Pro Asn Ala Gln Ser Ile Ile Arg Pro Trp Leu
         35                  40                  45

Cys Tyr Trp Ile Ile His Ser Ile Ala Leu Leu Gly Glu Ser Ile Asp
     50                  55                  60

Asp Asp Leu Glu Asp Asn Thr Val Asp Phe Leu Asn Arg Cys Gln Asp
 65                  70                  75                  80

Pro Asn Gly Gly Tyr Ala Gly Gly Pro Gly Gln Met Pro His Leu Ala
                 85                  90                  95

Thr Thr Tyr Ala Ala Val Asn Thr Leu Ile Thr Leu Gly Gly Glu Lys
            100                 105                 110

Ser Leu Ala Ser Ile Asn Arg Asn Lys Leu Tyr Gly Phe Met Arg Arg
        115                 120                 125

Met Lys Gln Pro Asn Gly Gly Phe Arg Met His Asp Glu Gly Glu Ile
    130                 135                 140

Asp Val Arg Ala Cys Tyr Thr Ala Ile Ser Val Ala Ser Val Leu Asn
145                 150                 155                 160

Ile Leu Asp Asp Glu Leu Ile Lys Asn Val Gly Asp Phe Ile Leu Ser
                165                 170                 175

Cys Gln Thr Tyr Glu Gly Gly Leu Ala Gly Glu Pro Gly Ser Glu Ala
            180                 185                 190

His Gly Gly Tyr Thr Phe Cys Gly Leu Ala Ala Met Ile Leu Ile Gly
        195                 200                 205

Glu Val Asn Arg Leu Asp Leu Pro Arg Leu Leu Asp Trp Val Val Phe
    210                 215                 220
```

```
Arg Gln Gly Lys Glu Cys Gly Phe Gln Gly Arg Thr Asn Lys Leu Val
225                 230                 235                 240

Asp Gly Cys Tyr Ser Phe Trp Gln Gly Gly Ala Val Ala Leu Leu Gln
                245                 250                 255

Arg Leu His Ser Ile Ile Asp Glu Gln Met Ala Glu Ala Ser Gln Phe
            260                 265                 270

Val Thr Val Ser Asp Ala Pro Glu Glu Lys Glu Cys Leu Asp Gly Thr
        275                 280                 285

Ser Ser His Ala Thr Ser His Ile Arg His Glu Gly Met Asn Glu Ser
    290                 295                 300

Cys Ser Ser Asp Val Lys Asn Ile Gly Tyr Asn Phe Ile Ser Glu Trp
305                 310                 315                 320

Arg Gln Ser Glu Pro Leu Phe His Ser Ile Ala Leu Gln Gln Tyr Ile
                325                 330                 335

Leu Leu Cys Ser Gln Glu Gln Asp Gly Gly Leu Arg Asp Lys Pro Gly
            340                 345                 350

Lys Arg Arg Asp His Tyr His Ser Cys Tyr Cys Leu Ser Gly Leu Ser
        355                 360                 365

Leu Cys Gln Tyr Ser Trp Ser Lys Arg Pro Asp Ser Pro Pro Leu Pro
    370                 375                 380

Lys Val Val Met Gly Pro Tyr Ser Asn Leu Leu Glu Pro Ile His Pro
385                 390                 395                 400

Leu Phe Asn Val Val Leu Asp Arg Tyr Arg Glu Ala His Glu Phe Phe
                405                 410                 415

Ser Gln Leu


<210> 23
<211> 419
<212> PRT
<213> Pisum sativum

<400> 23
Met Glu Ala Ser Thr Ala Ala Glu Thr Pro Thr Pro Thr Val Ser Gln
  1               5                  10                  15

Arg Asp Gln Trp Ile Val Glu Ser Gln Val Phe His Ile Tyr Gln Leu
             20                  25                  30

Phe Ala Asn Ile Pro Pro Asn Ala Gln Ser Ile Ile Arg Pro Trp Leu
         35                  40                  45

Cys Tyr Trp Ile Ile His Ser Ile Ala Leu Leu Gly Glu Ser Ile Asp
     50                  55                  60
```

```
Asp Asp Leu Glu Asp Asn Thr Val Asp Phe Leu Asn Arg Cys Gln Asp
 65                  70                  75                  80

Pro Asn Gly Gly Tyr Ala Gly Gly Pro Gly Gln Met Pro His Leu Ala
                 85                  90                  95

Thr Thr Tyr Ala Ala Val Asn Thr Leu Ile Thr Leu Gly Gly Glu Lys
            100                 105                 110

Ser Leu Ala Ser Ile Asn Arg Asn Lys Leu Tyr Gly Phe Met Arg Arg
        115                 120                 125

Met Lys Gln Pro Asn Gly Gly Phe Arg Met His Asp Glu Gly Glu Ile
    130                 135                 140

Asp Val Arg Ala Cys Tyr Thr Ala Ile Ser Val Ala Ser Val Leu Asn
145                 150                 155                 160

Ile Leu Asp Asp Glu Leu Ile Lys Asn Val Gly Asp Phe Ile Leu Ser
                165                 170                 175

Cys Gln Thr Tyr Glu Gly Gly Leu Ala Gly Glu Pro Gly Ser Glu Ala
            180                 185                 190

His Gly Gly Tyr Thr Phe Cys Gly Leu Ala Ala Met Ile Leu Ile Gly
        195                 200                 205

Glu Val Asn Arg Leu Asp Leu Pro Arg Leu Leu Asp Trp Val Val Phe
    210                 215                 220

Arg Gln Gly Lys Glu Cys Gly Phe Gln Gly Arg Thr Asn Lys Leu Val
225                 230                 235                 240

Asp Gly Cys Tyr Ser Phe Trp Gln Gly Gly Ala Val Ala Leu Leu Gln
                245                 250                 255

Arg Leu His Ser Ile Ile Asp Glu Gln Met Ala Glu Ala Ser Gln Phe
            260                 265                 270

Val Thr Val Ser Asp Ala Pro Glu Glu Lys Glu Cys Leu Asp Gly Thr
        275                 280                 285

Ser Ser His Ala Thr Ser His Ile Arg His Glu Gly Met Asn Glu Ser
    290                 295                 300

Cys Ser Ser Asp Val Lys Asn Ile Gly Tyr Asn Phe Ile Ser Glu Trp
305                 310                 315                 320

Arg Gln Ser Glu Pro Leu Phe His Ser Ile Ala Leu Gln Gln Tyr Ile
                325                 330                 335

Leu Leu Cys Ser Gln Glu Gln Asp Gly Gly Leu Arg Asp Lys Pro Gly
            340                 345                 350

Lys Arg Arg Asp His Tyr His Ser Cys Tyr Cys Leu Ser Gly Leu Ser
        355                 360                 365
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Leu Cys Gln Tyr Ser Trp Ser Lys Arg Pro Asp Ser Pro Pro Leu Pro
    370                 375                 380

Lys Val Val Met Gly Pro Tyr Ser Asn Leu Leu Glu Pro Ile His Pro
385                 390                 395                 400

Leu Phe Asn Val Val Leu Asp Arg Tyr Arg Glu Ala His Glu Phe Phe
                405                 410                 415

Ser Gln Leu
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